AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A cross polarization interference canceller comprising:

(a) first and second signal receivers which receive signals having been transmitted through first and second polarizations ~~vertical with each other~~which are orthogonal;

(b) first and second local oscillators each of which converts one of said signals into an IF signal;

(c) first and second demodulators each of which demodulates said IF signal for producing a base-band signal and a cross polarization interference cancel reference signal;

(d) a phase-difference detector which detects a phase-difference between local signals transmitted from said first and second local oscillators, and transmits a phase-difference signal indicative of the thus detected phase-difference; and

(e) first and second phase controllers associated with said first and second demodulators, respectively, and each equalizing phases of said base-band signal and said cross polarization interference cancel reference signal to each other in accordance with said phase-difference signal.

2. (original): The cross polarization interference canceller as set forth in claim 1, wherein said phase-difference detector transmits two phase-difference signals in which directions in which phases are deviated are opposite to each other, and wherein said first and second phase controllers receive said two phase-difference signals transmitted from said phase-difference

detector, and transmit signals to said first and second demodulators, respectively, in which signals phase-shifting directions are opposite to each other.

3. (original): The cross polarization interference canceller as set forth in claim 2, wherein each of said first and second phase controllers is comprised of a variable phase-shifter.

4. (original): The cross polarization interference canceller as set forth in claim 1, wherein each of said first and second demodulators is comprised of:

(c1) a carrier oscillator which converts frequencies of both IF signals transmitted through said first and second polarizations;

(c2) first and second analog-digital converters which convert said IF signals into first and second digital signals for said first and second polarizations, respectively;

(c3) a numerical controlled oscillator which transmits a carrier signal;

(c4) a first endless phase-shifter which receives both said first digital signal and said carrier signal, and demodulates said base band signal;

(c5) a second endless phase-shifter which receives both said second digital signal and said carrier signal, and demodulates said cross polarization interference cancel reference signal;

(c6) a filter which receives said cross polarization interference cancel reference signal, and produces a first signal indicative of interference caused by said second polarization;

(c7) an adder which adds said base band signal and said first signal to each other to thereby remove cross polarization interference;

(c8) a judgment circuit which receives an output signal transmitted from said adder, and transmits an error signal;

(c9) a carrier synchronization controller which controls a frequency of said carrier signal in accordance with said error signal; and

(c10) a tap coefficient controller which controls a tap coefficient of said filter in accordance with said error signal.

5. (original): The cross polarization interference canceller as set forth in claim 4, wherein each of said first and second phase controllers is comprised of a variable phase-shifter electrically connected to said second endless phase-shifter upstream thereof.

6. (original): The cross polarization interference canceller as set forth in claim 1, wherein said phase-difference detector includes:

(d1) a multiplier which multiplies signals transmitted from said first and second local oscillators, by each other to thereby transmit a frequency-difference signal;

(d2) an analog-digital converter which converts said frequency-difference signal to a digital signal;

(d3) a numerical controlled oscillator which transmits a local phase-difference signal;

(d4) a phase comparator compares said local phase-difference signal and said frequency-difference signal to each other, and transmits a difference signal indicative of a difference between said local phase-difference signal and said frequency-difference signal; and

(d5) a filter which controls a frequency of said local phase-difference signal in accordance with said difference signal.

7. (currently amended): A cross polarization interference canceller comprising:

(a) first and second signal receivers which receive signals having been transmitted through first and second polarizations ~~vertical with each other~~which are orthogonal;

(b) first and second local oscillators each of which converts one of said signals into an IF signal;

(c) first and second demodulators each of which demodulates said IF signal for producing a base-band signal and a cross polarization interference cancel reference signal;

(d) a phase-difference detector which detects a phase-difference between local signals transmitted from said first and second local oscillators, and transmits a phase-difference signal indicative of the thus detected phase-difference;

(e) first and second phase controllers associated with said first and second demodulators, respectively, and each equalizing phases of said base-band signal and said cross polarization interference cancel reference signal to each other in accordance with said phase-difference signal; and

(f) a reference oscillator electrically connected to both said first and second local oscillators for synchronizing said first and second local oscillators with each other.

8. (original): The cross polarization interference canceller as set forth in claim 7, wherein said phase-difference detector transmits two phase-difference signals in which directions in

which phases are deviated are opposite to each other, and wherein said first and second phase controllers receive said two phase-difference signals transmitted from said phase-difference detector, and transmit signals to said first and second demodulators, respectively, in which signals phase-shifting directions are opposite to each other.

9. (original): The cross polarization interference canceller as set forth in claim 8, wherein each of said first and second phase controllers is comprised of a variable phase-shifter.

10. (original): The cross polarization interference canceller as set forth in claim 7, wherein each of said first and second demodulators is comprised of:

(c1) a carrier oscillator which converts frequencies of both IF signals transmitted through said first and second polarizations;

(c2) first and second analog-digital converters which convert said IF signals into first and second digital signals for said first and second polarizations, respectively;

(c3) a numerical controlled oscillator which transmits a carrier signal;

(c4) a first endless phase-shifter which receives both said first digital signal and said carrier signal, and demodulates said base band signal;

(c5) a second endless phase-shifter which receives both said second digital signal and said carrier signal, and demodulates said cross polarization interference cancel reference signal;

(c6) a filter which receives said cross polarization interference cancel reference signal, and produces a first signal indicative of interference caused by said second polarization;

(c7) an adder which adds said base band signal and said first signal to each other to thereby remove cross polarization interference;

(c8) a judgment circuit which receives an output signal transmitted from said adder, and transmits an error signal;

(c9) a carrier synchronization controller which controls a frequency of said carrier signal in accordance with said error signal; and

(c10) a tap coefficient controller which controls a tap coefficient of said filter in accordance with said error signal.

11. (original): The cross polarization interference canceller as set forth in claim 10, wherein each of said first and second phase controllers is comprised of a variable phase-shifter electrically connected to said second endless phase-shifter upstream thereof.

12. (original): The cross polarization interference canceller as set forth in claim 7, wherein said phase-difference detector includes:

(d1) a multiplier which multiplies signals transmitted from said first and second local oscillators, by each other to thereby transmit a frequency-difference signal;

(d2) an analog-digital converter which converts said frequency-difference signal to a digital signal;

(d3) a numerical controlled oscillator which transmits a local phase-difference signal;

(d4) a phase comparator compares said local phase-difference signal and said frequency-difference signal to each other, and transmits a difference signal indicative of a difference between said local phase-difference signal and said frequency-difference signal; and

(d5) a filter which controls a frequency of said local phase-difference signal in accordance with said difference signal.

13. (currently amended): A method of canceling cross polarization interference, comprising the steps of:

(a) receiving signals having been transmitted through first and second polarizations ~~vertical with each other~~which are orthogonal;

(b) converting said signals having been received in said step (a) into IF signals;

(c) demodulating said IF signals for producing a base-band signal and a cross polarization interference cancel reference signal;

(d) detecting a phase-difference between said IF signals and transmitting a phase-difference signal indicative of the thus detected phase-difference; and

(e) equalizing phases of said base-band signal and said cross polarization interference cancel reference signal to each other in accordance with said phase-difference signal.

14. (original): The method as set forth in claim 13, further comprising the step of synchronizing said signals with each other.

15. (original): The method as set forth in claim 13, wherein said step (c) includes the steps of:

(c1) converting frequencies of both IF signals transmitted through said first and second polarizations;

(c2) converting said IF signals into first and second digital signals for said first and second polarizations, respectively;

(c3) demodulating said base band signal, based on said first digital signal and said carrier signal;

(c4) demodulating said cross polarization interference cancel reference signal, based on both said second digital signal and ~~said~~ a carrier signal;

(c5) producing a first signal indicative of interference caused by said second polarization; and

(c6) adding said base band signal and said first signal to each other to thereby remove cross polarization interference.

16. (original): The method as set forth in claim 13, wherein said step (d) includes the steps of:

(d1) multiplying signals transmitted from local oscillators, by each other to thereby transmit a frequency-difference signal;

(d2) converting said frequency-difference signal to a digital signal;

(d3) comparing ~~said~~ a local phase-difference signal and said frequency-difference signal to each other, and transmitting a difference signal indicative of a difference between said local phase-difference signal and said frequency-difference signal; and

(d4) controlling a frequency of said local phase-difference signal in accordance with said difference signal.